REMARKS

Examiner is thanked for allowance of claim 6. Claim 6 is amended to incorporate the limitations of all claims from which it depends. All remaining claim rejections are hereby respectfully traversed. Favorable reconsideration is respectfully requested.

Claim 1 is reproduced for purposes of discussion:

1. An apparatus for sensing remote load voltages, comprising: a power converter;

a plurality of remote loads, each remote load located in a loop connected to the power converter; and

a feed back loop connected to the power converter, the feed back loop being physically adjacent to the power converter, wherein the feed back loop further comprises a first path and a second path, and the first path and the second path are in parallel.

In responding to the arguments presented by Applicant previously, Examiner states in the Office action of 6/16/2006:

> In this instance, the idea of having a plurality of loads and the extra calculations and the monitoring of more loads that does along with it is obvious to one of ordinary skill in the art and therefore is not considered *unexpected*. [Emphasis in original.]

Applicant respectfully submits that the inclusion of "a plurality of remote loads, each load located in a loop connected to the power converter," is not a mere duplication. The inclusion of multiple remote loads presents specific and unique difficulties, and the solution to these problems (as

described in the present innovations) would not be obvious to one or ordinary skill in the art.

Specifically, when a remote load is sensed with a feedback loop, the voltage sensed is sometimes (or usually) less than the voltage regulated at the terminals of the converter due to drop in the transmission line voltage. Some solutions to this problem have given rise to other problems themselves. For example, use of a signal transmission line to regulate the converter to provide correct voltage at the load can cause delays or phase shifts in the feedback signal from the load. Remote load demands can also cause swings at the terminals of the power converter when remote load sensing is not at the power converter's terminals.

In the case of multiple remote loads (particularly important in the context of the present rejection), the multiple remote loads can suffer from over-voltage conditions (instantaneous or continuous) when sensing is done only at the farthest remote load. The present application acknowledges these problems at paragraphs 7 and 8, reproduced below:

> **[0007]** Regardless of the type of design of a switching converter, there is still a basic problem when a remote load voltage is sensed with a feedback loop, because the voltage at a remote load is usually less than the voltage regulated at the terminals of the converter due to a drop in transmission line voltage. Some attempts have been made to sense the remote load voltage, via a signal transmission line, to regulate the converter to provide the correct voltage at the load. However, this approach introduces a new problem in that the voltage signal fed back from the load is delayed, and possibly phase shifted, from the actual signal at the load due to the long transmission line used to feedback the voltage signal.
>
> **[0008]** Furthermore, when remote sensing is not at the power converter's terminals, the terminals of the power converter can swing wildly in response to the remote load demands. If other loads were connected to the same converter, but not as far away as the remote sensing, these loads could suffer from over-voltage excursions or even continuous over-voltage conditions due to the sensing at the farthest remote load (this is called a multiple load problem.) And even worse, due to the delay and phase shift of the transmission lines in the complete circuit, the converter can become unstable due to

inadequate overall feedback phase margin.

In the present case, claim 1 includes limitations to "a plurality of remote loads, each remote load located in a loop connected to the power converter...." This claim language invokes the issues described immediately above, namely, the multiple load problem.

Applicant respectfully submits that this distinction is not a mere duplication of existing and known elements. Applicant is not claiming to have invented the idea of multiple remote loads; however, Applicant has invented a solution to the problem that arises when multiple remote loads are implemented.

In the context of the references cited against claim 1, there are no multiple remote loads present. Hence, the circuit of Sashida would not experience the problems discussed above with respect to multiple remote loads. If Sashida attempted to add other remote loads to its circuit, then Sashida would doubtless experience and suffer from the very problems identified by the inventors of the present application and recited above. However, Sashida provides no solution to this problem.

Hence, by only suggesting that the art shows one load in the given context, Examiner has not made out a prima facie case against the present claim 1. By not showing the plurality of loads, the suggested teaching of Sashida fails to address the "multiple load problem." Hence, the showing of only one load as opposed to the claimed plurality of loads fails to teach or suggest all limitations of claim 1. All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994).

Therefore, at least claim 1 is believed distinguished from the cited reference. Further, the arguments presented in favor of claim 1 are also believed to apply to claim 9.

At least claim 8 is also believed distinguished over the cited references, and is reproduced below:

8. A method for sensing remote load voltages comprising the steps of:

connecting a remote load to a loop to a power converter;
devising an impedance for a feed back loop according to a weighted factor for the feed back loop; and
connecting the feed back loop to the power converter, wherein the feed back loop is physically closer to the power converter than the remote load.

In rejecting claim 8, Examiner states in part:

> He [Sashida] teaches devising an impedance (405a) for a feed back loop according to the cross current.

Applicant respectfully submits that the impedance taught in Sashida does not teach or suggest the claimed limitation of, "devising an impedance for a feed back loop <u>according to a weighted factor for the feed back loop</u>...." as claimed. [Emphasis added.]

In responding to Applicant's arguments, Examiner states in part:

> According to Sashida, the weighted factor for devising the impedance in this instance is having appropriate impedance for restricting the cross current in the output frequency.... Therefore the weighted factor would be the cross current.

Examiner cites Col. 10, lines 23-25, which state:

> Z may be any transfer function when having an appropriate impedance for restricting the cross current in the output frequency.

Applicant respectfully disagrees that this passage teaches the claimed limitation of, "devising an impedance for a feed back loop according to a weighted factor for the feed back loop" as claimed in at least claim 8.

The passage from column 10 merely recites the purpose of the impedance, and does not teach or suggest a weighted factor for the feed back loop. The passage of column 10 sets limits on the value of Z depending on its use, in this case, restricting the cross current. However, this is not a <u>weighted factor for the feedback loop</u>, as claimed.

The weighted factor as claimed refers to a weighted importance to the system. For example, paragraph 19 of the current application states:

> [0019] By setting appropriate loop impedances (or gains) for each loop according to its weighted importance in the system, the converter can be reliably controlled and the optimum performance for the system can be achieved. The impedance of each loop is set according to the desired relative gain of each loop according to its importance relative to other critical points being sensed. The lower the impedance of a loop, the higher its relative gain will be in the system of all loops. For example, if load point number one is critical in its DC value (requiring tight regulation of say 1%) and load point number two is not very critical (maybe only needing regulation to say 10%), the impedance of load point number one in loop one could be set at, for example, 100 ohms vs. 1000 ohms for loop two.

Though Sashida does teach generally setting a value for an impedance of a feed back loop, it does not teach or suggest the claimed concept of a weighted factor for the feedback loop.

All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990).

In the present case, the cited reference Sashida fails to teach or suggest the claimed limitation of a weighted factor for the feedback loop. Hence Sashida fails to teach or suggest all claimed limitations.

By virtue of their dependence on allowable claims, all dependent claims are now believed in condition for allowance. Favorable reconsideration is respectfully requested.

Conclusion

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

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Respectfully submitted,

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